University of Zagreb

1. GENERAL INFORMATION				
1.1 Course teacher	Teachers in all scientific-research positions at the Faculty of Chemical Engineering and Technology, University of Zagreb and Faculty of Chemistry and Technology, University of Split who teach at the graduate study programme Chemical and Environmental Technology		1.6 Year of the study	2 (4th semester)
1.2 Name of the course	Master thesis		1.7 ECTS credits	30
1.3 Associate teachers			1.8 Type of instruction (number of hours L + E + S + e-learning)	Total:300 (0L+300E+0S)
1.4 Study programme (undergraduate, graduate, integrated)	Graduate		1.9 Expected enrolment in the course	20
1.5. Status of the course	☒ mandatory	☐ elective	1.10 Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%)	1

2. COUSE DESCRIPTION	
2.1. Course objectives	By writing a master thesis, which is a comprehensive task, students will through independent work demonstrate the ability to analyse and solve a given problem from a theoretical and practical point of view. Students will independently conduct the experimental part of their thesis in the laboratory with the aid of relevant scientific literature and mentor suggestions; they will outline solutions to the problem in a written format, using knowledge acquired through classes at the graduate study programme. Finally, students will present their thesis in a written and oral format. Mentors, teachers in all scientific-research positions suggest the thesis, and the Faculty council appoints mentors to students.
2.2. Enrolment requirements and/or entry competences required for the course	Audited all courses from the 1st, 2nd and 3rd semester.
2.3. Learning outcomes at the level of the programme to which the course contributes	• Compile and apply advanced knowledge of natural and technical sciences, particularly chemical engineering and environmental engineering in solving scientific, professional and general social problems. • Solve engineering problems using the scientific method combining expert knowledge from chemistry, environmental, and chemical engineering as well as material science and engineering. • Correlate expert knowledge from chemistry, chemical engineering and material engineering with awareness of influence on society, economy and environment. • Plan and independently perform experiments in order to confirm a hypothesis to estimate economic and ecological efficiency of processes.

	• Utilise advanced laboratory procedures and instruments for synthesis of new products, create sustainable processes, and solve problems of water, air and soil pollution. • Apply different analytical techniques, analytical and numerical methods, as well as software tools in creative problem solving of engineering challenges, proposing sustainable technological solutions. • Optimise complete and sustainable technological processes using analysis and modelling aimed at waste minimization utilising the strategy of the closed cycle manufacturing. • Identify and analyse complex problems in technological processes of chemical and related industries. • Apply tools, methods and standards for monitoring and assessing the quality of processes and products, as well as their environmental impact, and to predict potential risks in working with technological processes and developing products. • Identify and discuss advantages, disadvantages and limitations of certain methods for preparation, synthesis, analysis and processing of samples in accordance with sustainable development and life cycle of products and processes. • Independently organise and plan timelines, apply a general methodology for project planning and management in a business environment • Create a critical analysis, evaluation and interpretation of personal results, and compare them with existing data in scientific and expert literature • Demonstrate independence and reliability in independent work, as well as effectiveness, reliability and adaptability in team work • Outline results of independent and teamwork in a written and oral form to non-experts and experts in a clear and coherent way. • Develop work ethic, personal responsibility and tendency for further skill and knowledge acquisition, according to standards of engineering practice
2.4. Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	1. Correlate skills and knowledge acquired during the graduate study programme; develop the affinity for further learning from relevant literature with mentor's advice. 2. Independently conduct experiments, as well as analyse and interpret their results. 3. Select, argument and justify the proposed solution 4. Formulate and write a thesis according to instructions, as well as form conclusions in a linguistically and ethically correct way 5. Publicly and orally present their results using a computer presentation within 20 minutes
2.5. Course content (syllabus)	**WEEK 1.** Experimental/computational work on the topic of Master thesis **WEEK 2.** Experimental/computational work on the topic of Master thesis **WEEK 3.** Experimental/computational work on the topic of Master thesis **WEEK 4.** Experimental/computational work on the topic of Master thesis **WEEK 5.** Experimental/computational work on the topic of Master thesis **WEEK 6.** Experimental/computational work on the topic of Master thesis **WEEK 7.** Experimental/computational work on the topic of Master thesis **WEEK 8.** Experimental/computational work on the topic of Master thesis **WEEK 9.** Experimental/computational work on the topic of Master thesis **WEEK 10.** Experimental/computational work on the topic of Master thesis **WEEK 11.** Experimental/computational work on the topic of Master thesis **WEEK 12.** Experimental/computational work on the topic of Master thesis

	WEEK 13. Experimental/computational work on the topic of Master thesis **WEEK 14.** Experimental/computational work on the topic of Master thesis **WEEK 15.** Experimental/computational work on the topic of Master thesis		
2.6. Format of instruction:	☐ lectures ☐ seminars and workshops ☒ exercises ☐ online in entirety ☐ partial e-learning ☐ field work	☒ independent assignments ☐ multimedia and the internet ☒ laboratory ☒ work with mentor ☐ (other)	2.7. Comments:
2.8. Student responsibilities	To fulfil all tasks defined by Master thesis. When the student receives a positive grade from the mentor, he/she will defend the Master thesis before the Committee.		

2.9. Monitoring student work	Class attendance		NO	Research	YES		Oral exam	YES	
	Experimental work	YES		Report		NO	Independent and group assignments		NO
	Essay		NO	Seminar paper		NO	Writing a master thesis	YES	
	Preliminary exam		NO	Practical work	YES		Public defence of the master thesis	YES	
	Project		NO	Written exam		NO	ECTS credits (total)	30	

	Title	**Number of copies in the library**	**Availability via other media**
2.10. Required literature (available in the library and/or via other media)	According to mentor instructions		
2.11. Optional literature	According to mentor instructions		
2.12. Other (as the proposer wishes to add)			